
Naturally derived myocardial matrix as an injectable scaffold for cardiac tissue engineering.

Journal: Biomaterials

Publication Year: 2009

Authors: Jennifer M Singelyn, Jessica A DeQuach, Sonya B Seif-Naraghi, Robert B Littlefield, Pamela J Schup-Magoffin, Karen L Christman

PubMed link: 19608268

Public Summary:

Scientific Abstract:

Myocardial tissue lacks the ability to significantly regenerate itself following a myocardial infarction, thus tissue engineering strategies are required for repair. Several injectable materials have been examined for cardiac tissue engineering; however, none have been designed specifically to mimic the myocardium. The goal of this study was to investigate the in vitro properties and in vivo potential of an injectable myocardial matrix designed to mimic the natural myocardial extracellular environment. Porcine myocardial tissue was decellularized and processed to form a myocardial matrix with the ability to gel in vitro at 37 degrees C and in vivo upon injection into rat myocardium. The resulting myocardial matrix maintained a complex composition, including glycosaminoglycan content, and was able to self-assemble to form a nanofibrous structure. Endothelial cells and smooth muscle cells were shown to migrate towards the myocardial matrix both in vitro and in vivo, with a significant increase in arteriole formation at 11 days post-injection. The matrix was also successfully pushed through a clinically used catheter, demonstrating its potential for minimally invasive therapy. Thus, we have demonstrated the initial feasibility and potential of a naturally derived myocardial matrix as an injectable scaffold for cardiac tissue engineering.

Source URL: <https://www.cirm.ca.gov/about-cirm/publications/naturally-derived-myocardial-matrix-injectable-scaffold-cardiac-tissue>